100454

CDM FEDERAL PROGRAMS CORPORATION
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October 15, 1993

Ms. Donna McGowan
TES VII Regional Project Officer
U.S. Environmental Protection Agency
841 Chestnut Street
Philadelphia, Pennsylvania 19107

PROJECT: EPA CONTRACT NO: 68-W9-0004

DOCUMENT NO: TES7-C03041-EP-DPHT

SUBJECT: Work Assignment C03041
Standard Chlorine Site
Compliance Evaluation and Technical Review of the
Feasibility Study Addendum
TES7-C03041-RT-DPHV-02

Dear Ms. McGowan:

Please find enclosed the Compliance Evaluation and Technical Review of the Feasibility Study Addendum for Standard Chlorine of Delaware, Delaware City, Delaware. This report is being submitted as partial fulfillment of the reporting requirements for this work assignment.

If you have any comments regarding this submittal, please contact me at (215) 293-0450 within two weeks of the date of this letter.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION (CDM Federal)

for:

Mark diFeliciantonio
Regional Manager

MdF/dmh

Enclosure

cc: Kate Lose, EPA Work Assignment Manager, CERCLA Region III
Jean Wright, TES VII Zone Project Officer (letter only)
Constance V. Braun, CDM Federal Program Manager
Robert Murphy, Versar Inc., (letter only)

COMPLIANCE EVALUATION AND TECHNICAL REVIEW
FEASIBILITY STUDY ADDENDUM
STANDARD CHLORINE OF DELAWARE, INC. SITE
DELAWARE CITY, DELAWARE

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

Work Assignment No.	:	C03041
EPA Region	:	III
Site No.	:	3PH6
Contract No.	:	68-W9-0004
CDM FEDERAL PROGRAMS CORPORATION Document No.	:	TES7-C03041-RT-DPHV-02
Work Assignment Project Manager	:	Robert Savill
Telephone Number	:	(215) 293-0450
Primary Contact	:	Kate Lose
Telephone Number	:	(215) 597-0910
Date Prepared	:	October 15, 1993

TABLE OF CONTENTS

1.0 INTRODUCTION

CDM Federal Programs Corporation (FPC) received a work assignment (WA No. C03041) to provide technical enforcement support to EPA Region III under EPA Contract No. 68-W9-004. The purpose of this assignment is to provide oversight of the remedial investigation/feasibility study (RI/FS) field activities and to review and evaluate documents submitted by the responsible party (RP) or the RP's contractor in support of the RI/FS for the Standard Chlorine of Delaware, Inc. (SCD) site located in Delaware City, Delaware. This report presents the results of the TES VII Team Member's evaluation of the September 1993 Feasibility Study Addendum for the SCD site.

Standard Chlorine of Delaware, Inc. manufactures chlorobenzenes on a 46-acre site in Delaware City, Delaware. In September 1981, about 5,000 gallons of monochlorobenzene spilled from a railroad car on the Standard Chlorine property. Subsequent sampling was performed and identified chlorobenzenes in onsite soils, in shallow ground water underlying the site, and in nearby Red Lion Creek. The RP and their contractor, Roy F. Weston, Inc., have studied this problem and have prepared reports on the extent of contamination, evaluated remedial alternatives and feasible technologies, and have begun recovery of contaminated ground water at the site. In September 1985, the SCD site was proposed by the EPA for the National Priorities List (NPL).

On January 5, 1986, onsite storage tanks ruptured and 562,000 gallons of paradichlorobenzene and trichlorobenzene were spilled onto the SCD property and into the adjacent wetlands. The RP engaged a remedial contractor and initiated clean-up activities within hours of the spill occurrence. The RP and the clean-up contractor prepared the ESD detailing emergency clean-up activities and ongoing remedial activities at the SCD site.

Standard Chlorine signed a consent order with the Delaware Department of Natural Resources and Environmental Control (DNREC) on January 22, 1988. As required in the consent order, they submitted a Phase I RI/FS work plan for approval by DNREC. The consent order was then amended so that a single site-wide RI/FS could be performed. A revised RI/FS work plan was then submitted to EPA and DNREC and was approved for the current activities at the SCD site.

This evaluation report comprises five sections. Section 2.0 outlines the TES VII Team Member's approach to the compliance evaluation and technical review of the FS report. Section 3.0 presents general comments from the technical review and Section 4.0 presents specific comments. Finally, Section 5.0 presents conclusions and recommendations that were developed from the technical review of the FS report.

2.0 APPROACH TO COMPLIANCE EVALUATION AND TECHNICAL REVIEW

The TES VII Team Member reviewed the September 1993 SCD FS Addendum to assess the adequacy and completeness of the information to support the requirements of an FS and treatability study. The scope and quality of the FS Addendum were evaluated with respect to (1) objectives for conducting an FS under the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), as implemented under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and as amended under the Superfund Amendments and Reauthorization Act of 1986 (SARA), (2) concepts and technical standards for conducting an FS as discussed in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (October 1988), and (3) procedures consistent with standard industry practices common to the technical issues in accordance with EPA policies. The TES VII Team Member's judgement of whether compliance deficiencies exist is based on the objectives and guidelines set forth in the NCP and U.S. EPA guidance.

3.0 GENERAL COMMENTS

This section summarizes general comments on the September 1993 FS Addendum for the SCD site. These comments address items that were recurring throughout the report or items that refer to the overall tone of the report. Specific comments, referenced to the appropriate section and page number of the FS report, are provided in Section 4.0.

In general, the FS Addendum contains adequate technical information to select a preferred alternative for remediation of the SCD site. However, the following technical deficiencies were noted: (1) a comparative analysis of the alternatives with respect to one another was not presented; (2) the descriptions of the revised alternatives are not clearly presented; and (3) the conclusions drawn regarding the results of the treatability study have not been adequately discussed and supported.

The FS Addendum does not provide a comparative analysis of alternatives. Section 4 briefly compares each of the revised alternatives with the respective alternative presented in the FS report, but a comparative analysis of the revised alternatives with respect to one another was not conducted. Based on the changes that were made to the alternatives, a thorough analysis of the strengths and weaknesses of each alternative is essential to the selection of the final remedial alternative.

There appear to be some discrepancies regarding the areas and volumes to be treated by each technology type for each alternative. Due to the changes to the alternatives resulting from the treatability study, it would be useful to provide a revised table similar to Table 6-1 of the FS report, specifying the medium, technology type, and area or volume applicable to each alternative.

Section 9.0 of the Treatability Study report and Section 2.0 of the FS Addendum provide a brief overview of the findings of the treatability study. A complete discussion of the treatability study conclusions relative to the treatment technologies being evaluated at the SCD site is not provided. Section 3.0 of the FS Addendum discusses the applicability of bioremediation to the site, which is based primarily on the conclusions of the treatability

study. However, a number of treatability study results cited in this section are not discussed in the overview of treatability study findings. For example, Section 2.0 of the FS Addendum does not address the results of treatability testing on sediments, but Section 3.0 indicates that this option is potentially applicable to in-situ treatment of sediments and the effectiveness of ex-situ bioremediation is questioned. Additionally, the conclusions drawn regarding the effectiveness of bioremediation based on information gathered from the treatability studies are not well supported. For instance, the leaching of contaminants observed during the column tests conducted on subsurface soils under anaerobic conditions was used to eliminate in-situ bioremediation of subsurface and surface soils from further consideration, but no discussion of whether this phenomenon would occur under aerobic conditions or for surface soils and sediments is presented in the overview of conclusions.

4.0 SPECIFIC COMMENTS

This section presents specific comments and questions, as well as typographical errors, pertaining to issues discussed in the September 1993 FS Addendum for the SCD site. Comments are itemized by the specific section and page number of the FS Addendum.

Section	Page	Comment
Ex. Summary	ES-6	The discussion of Alternative 5 indicates that one option will include ex-situ biological treatment of sediments and soils and the other option will include in-situ biological treatment of sediments. An explanation of how soils will be treated under the second option should be provided.
Ex. Summary	ES-8	The evaluation of alternatives includes cost data for each of the alternatives, except Alternative 5. Cost data for Alternative 5 should be included. Additionally, Alternatives 3 and 4 have been modified to include a biological treatment component. The costs associated with this additional treatment technology should be discussed.
Ex. Summary	ES-8	The presentation of a recommended alternative is not appropriate.
2.0	2-1	A more detailed discussion of the results of the treatability study and the potential impacts these results may have on the treatment technologies being evaluated should be included in this section.
2.2	2-1	The first bullet item indicates that the treatability study revealed evidence of biotransformation in aerobic subsurface soil. The second bullet item indicates that the decrease in chlorinated benzenes in aerobic subsurface soils is attributable to stripping. This discrepancy of findings should be clarified.

3.2.2	3-6	The results of the treatability study indicated that biotransformation occurred in surface soils and subsurface soils, but not in sediments. Surface soils and subsurface soils have been eliminated from consideration based on potential groundwater impacts from the leaching of contaminants. This conclusion was based on the results of the soil column tests, which were conducted on subsurface soils under anaerobic conditions only. Since evidence of biotransformation of subsurface soils was found under aerobic conditions, explain the validity of this conclusion. Although no evidence of biotransformation was noted for sediments, sediments in the wetlands were retained for evaluation. If there is evidence to suggest that despite the results of the treatability study, in-situ bioremediation is a viable option, this evidence should be explained. Additionally, the potential impacts of contaminants leaching from sediments should also be commented on. It is unclear why the results of the subsurface soil column tests have been applied to the surface soils, but not the subsurface soils.
3.2.3	3-7	The FS Addendum indicates that information gathered from the treatability study does not change the unit costs for this alternative. However, the areas and volumes of media to be treated have changed, thus the total present worth cost for this alternative should be recalculated.
3.3	3-8	A more detailed discussion regarding the integration of in-situ bioremediation with Alternatives 3 and 4A should be provided. Specifically, a discussion of which areas or volumes this option will be applicable to and which treatment technologies it will supplant should be included. A discussion of the effectiveness and cost of these revised alternatives should also be provided.
4.1	4-1	A revised cost estimate for Alternative 3 should be provided.
4.2	4-1	A revised cost estimate for Alternative 4A should be provided.

4.3 and 4.4	4-2	For Alternative 5A the report indicates that more information is required to determine if bioremediation can be performed on sediments, yet the discussion of Alternative 5B does not raise this concern. If the reason for the concern over the applicability of bioremediation to sediments is that in-situ is expected to be more effective than ex-situ treatment for the sediments, Alternative 5A should be modified to include an in-situ bioremediation option for sediments.
Attachment 1	Fig. 1	Figure 1 indicates the general areas where samples were collected for the treatability study, but the location of each sample point is unclear.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The TES VII Team Member evaluated the information contained in the FS Addendum prepared by Roy F. Weston, Inc., for the Standard Chlorine of Delaware, Inc., (SCD) site (Roy F. Weston, February 1993). This report was reviewed to assess the RP contractor's adequacy and completeness of the information to support the requirements of a Feasibility Study. The FS Addendum generally contains the technical information required to select a preferred remedial alternative, but the presentation and discussion of the data requires some revision.

The FS Addendum should be amended to include a complete discussion of the results of the treatability studies and any potential impacts to the technologies being evaluated at the SCD site. Any conclusions inferred from the results of the treatability studies that are used to evaluate the applicability and effectiveness of the alternatives should be fully documented and supported.

A comparative analysis of the revised remedial alternatives should be presented. The findings of the treatability studies resulted in the modification of several of the remedial alternatives, therefore, the initial comparative analysis conducted for the FS report is no longer valid.

The description of the revised remedial alternatives should be clarified to provide an accurate representation of the media, technology types, and areas and volumes associated with each alternative. Inclusion of a table similar to Table 6-1 of the FS report would be helpful. Additionally, each of the comments raised in Section 4.0 Specific Comments should be addressed.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ROBERT S. KERR ENVIRONMENTAL RESEARCH LABORATORY
P. O. BOX 1198
ADA, OKLAHOMA 74820

October 8, 1993

MEMORANDUM

SUBJECT: Technical Review of Bioremediation Treatability Testing Program Summary - Review, Standard Chlorine Site (93-RO3-001)

FROM: Mary E. Randolph, Microbiologist
Applications and Assistance Branch

TO: Katherine Lose, RPM, (3HW42)
DE/MD Section
EPA, Region 3

Per your technical support request dated September 20, 1993, the document entitled, "Bioremediation Treatability Testing Program Summary- Review," has been reviewed for technical merit and appropriateness by Dominic DiGiulio, Scott Huling, Hugh Russell, John Matthews, and me. If you have any questions or the Technology Support Center can be of further assistance, please contact me at 405-436-8616.

General Comments:

Overall, we feel that the treatability data is inconclusive and non-supportive with respect to the role of the biological fate of the compounds studied. This comment is supported by the following: (1) variability of the concentration of total chlorobenzenes (Tot-CB) observed in the flasks and the associated lack of confidence in the data, (2) the potential for volatile losses from the reactor flasks, (3) inconclusive stoichiometric release of chlorides, (4) no nutrient consumption, and (5) lack of microbial data. While it is widely accepted that dichlorobenzene is biodegradable and is possible that biodegradation may have occurred in these tests, the data presented is inconclusive in support of such degradation. It should be noted that while the results from these tests are inconclusive and unsupportive with respect to the role of biological processes, it is entirely possible that some form of bioremediation can be effectively used at this site.

The study included an anaerobic set of flasks to evaluate the fate of Tot-CB under anoxic conditions. The anaerobic process involving reductive dechlorination is a technology that is problematic with respect to in-situ field implementation. Presently, the ability to design, construct and implement a system involving successful application of this process has not been demonstrated. However, it is reasonable to expect that slurry

phase treatment in a reactor vessel would be less problematic and may be feasible. To the best of our knowledge, this process has not been successfully demonstrated.

It is reasonable to expect that in aerobic biological systems, the greater the degree of chlorination, the slower the rate of biodegradation. Correspondingly, the accumulation of lower chlorinated compounds is unlikely. An exception to this trend would be if the lower chlorinated compounds were inhibitory to microbial processes. In such cases, these compound might accumulate. Under anaerobic conditions, the more oxidized (chlorinated) compounds (hexa, penta, tetra, tri) are more easily dechlorinated via reductive dechlorination processes, i.e. the compound acts as an electron acceptor; and the less chlorinated compounds (mono, di) are less amenable to the reductive dechlorination process. It follows that reductive dechlorination would be more effective on compounds that are highly substituted than the mono- and dihalogenated compounds.

This overall perspective should be considered when scoping the remediation feasibility options. For example, the primary form of contaminants at the site appear to be the mono- and dihalogenated compounds (i.e. Memo dated 8/26/93 transmitting the descriptive statistics for chemicals of concern in subsurface media). Based on the relatively low amount of the 3, 4, 5, and 6 chlorinated compounds, the costs associated with reductive dechlorination remediation may reduce the overall feasibility of this remediation approach. Further evaluation of this point is recommended.

In general, it appears that the scoping of the feasibility study should be re-evaluated. Information contained in this report indicates that the treatability study may have been implemented prior to identifying specific objectives of the study or scoping/screening of the overall remediation approach. For example, while the report is entitled, "Bioremediation Treatability Testing Program - Summary of Findings", it is unclear whether bioslurry, land treatment, in-situ, bioventing, etc., remediation technologies are targeted for this site. The potential target technology should be narrowed down so a screening test could be designed to address the feasibility of each target technology with respect to more focused, site specific issues.

Specific comments concerning the document are as follows:

Section 4.0 Sample Characterization Results

1. The initial concentration of total chlorobenzenes (Tot-CB) in the soil and aquifer material, and the initial concentration (Day 0) of Tot-CB in the flask reactors (i.e. Figures 2-7) are summarized in Table 1.

The concentration in the flask reactors is generally lower than the site sample initial concentration reported in section 4.2. Since each reactor essentially consisted of approximately 20 g. of

media and 80 ml of water (i.e. sections 6.2.1, 6.2.2), then the lower values can be partially attributed to the partitioning of Tot-CB to the water phase. Since 1,2- and 1,4-Dichlorobenzene (volatile compounds with Henrys Constants of $1.88X10^{-3}$ and $1.58X10^{-3}$ ($atm-m^3/mole$)) compose the largest fraction of the contaminants, volatile losses occurring during sample transfer may have occurred as well. Variability in the fraction remaining may represent the heterogeneous nature of the sample material, sample transfer, or analyses. It is worth noting that the initial slurry phase Tot-CB concentrations do not reflect field concentrations, and that the initial slurry phase concentration is variable which may affect its fate in the reactor. Assuming the variability is due to analytical constraints, data confidence should be considered when evaluating the test results.

The high fraction remaining in the sediment sample indicates that the initial concentration estimate may have been incorrect. Correspondingly, the variability of the sediment sample results (Figures 6 and 7) may also reflect this observation.

Table 1 - Summary of Initial Total Chlorobenzenes in Site Samples and in the Flask Reactors.

Media	Site sample [Tot-CB]i (mg/Kg)	Flask reactors [Tot-CB]i (mg/Kg) Aerobic	Anaerobic
Surface soil	5370 -	3700 (69%)(1)	3400 (63%)
		2400 (45%)	2600 (48%)
		1400 (26%)	2600 (48%)
Subsurface soil	1080	480 (44%)	450 (42%)
		420 (39%)	300 (28%)
		200 (19%)	250 (23%)
Sediment	190	430 (226%)	300 (158%)
		410 (216%)	250 (132%)
		290 (153%)	125 (66%)

(1) fraction remaining relative to the initial site sample concentration

Section 5.0 Experimental Design:

1. The anaerobic bioremediation scenario was conducted over 60 days, a timeframe that may not allow sufficient biodegradation by an unacclimated microbial population.

2. Triplicate flasks were used, but the data presented in Attachment 10 does not indicate whether the samples obtained were analyzed in triplicates. It is recommended that this data be clearly reported.

Section 6.2 Aerobic Flask Tests:

1. The aerobic flasks were covered with loosely fitted plastic caps to minimize evaporative losses. This experimental design does not minimize volatile losses from the flasks. Therefore, volatilization must also be considered one of the fate mechanisms in the treatability study data analysis.

2. The abiotic control in the aerobic and anaerobic flasks were amended with a 37 percent formaldehyde solution. The volume of formaldehyde solution was not specified. It may be possible that formaldehyde, if present in low concentration, may have been used by microbes as substrate.

Section 6.3 Anaerobic Flask Tests:

1. It is not clear whether the control flask was amended with the digester sludge inoculum. Since the results from the amended flasks are compared to the control, it is prudent to amend the control flask with the digester sludge.

2. Since the flasks were opened at least three times during the experiment, volatilization from the anaerobic reactors cannot be ruled out as a loss mechanism from the reactors. This is particularly true when considering the volatility of the compounds.

Section 8.0 Findings

1. Section 8.4.1 indicates that the nutrients (N and P) were constant throughout the test period for all test scenarios. Although the data is not presented to evaluate more thoroughly, this indicates that no measurable utilization of nutrients occurred, which infers that biological processes may have been insignificant in these tests.

Section 9 Conclusions:

1. It is concluded in section 9.1 that presumptive evidence of biodegradation of Tot-CB is seen in the chlorinated benzene decline in conjunction with an increase in the chloride concentration for the anaerobic surface soil scenario. While it is true that the overall chloride concentration increases relative to the control, there were two anomalous trends. In the first 10 days, when the Tot-CB decreases significantly, there was not an increase in chlorides. Second, from days 10-30, there was an increase in the Tot-CB concentration, and an increase in the chloride concentration. These two observations are contradictory with respect to biological reductive dechlorination processes. It was not until days 30-60 when the decrease in Tot-CB occurred simultaneously with an increase in chlorides. Additionally, the abiotic control flask indicated essentially the same Tot-CB trends as the biotic treatment flasks. A strict interpretation would indicate abiotic processes dominated the fate of Tot-CB, rather than biotic.

Based on the variability of the Tot-CB concentration as observed during days 0, 10 and 30 (i.e. decreasing, increasing concentrations) there is questionable confidence that the concentration observed during day 60 represents a significant loss.

2. Section 9.5 indicates that nutrient addition in the wetland areas may promote natural degradation of contaminants, as seen in the anaerobic surface soil (Fig. 3) and aerobic subsurface soil (Fig. 4) tests. This conclusion is not supported by the data presented. There is no clear evidence, that the data from the anaerobic surface soil nor the aerobic subsurface soil can be attributed to biological processes. The amendment of a wetlands area with nutrients, based on the results of this study, has no technical merit. Additionally, nutrient amendment to wetlands is much more complex than simulated in this study and has major ecological implications. Careful evaluation is highly recommended.

The following specifically addresses the comment mentioned in the previous memo dated January 22, 1993 that all of the compounds are both volatile and amendable to aerobic biodegradation and could be good candidates for bioventing and/or soil vacuum extraction technologies. There is always the concern that some contaminant concentrations in some locations may be high enough to potentially inhibit microorganisms. Several figures have been prepared and attached to illustrate mass in the air phase versus the fraction of organic carbon content in soils. The equation describing this relationship is also included. It is apparent from inspection of these figures that chlorobenzene can be readily removed from soil using soil venting while dichlorobenzenes may or may not be effectively removed depending on the fraction of organic carbon content in soils at the facility. Tri, tetra, penta, and hexachlorobenzenes can not be effectively removed from soils by venting. In situ removal of these compounds may be possible through bioremediation of which bioventing is an option. Oxygen in the form of air can be introduced via air extraction and/or air injection wells. Oxygen consumption rates can be easily measured using vapor probes.

One factor limiting the effectiveness of venting/bioventing would be reduced permeability in highly contaminated areas, especially if higher chlorinated benzenes have precipitated out of solution or are present as polymers in soils. The compounds 1,4 dichlorobenzene, 1,2,3-trichlorobenzene, 1,3,5-trichlorobenzene, and all tetra, penta, and hexachlorobenzenes exist as solids at room temperature when present in pure chemical form. The Standard Chlorine Facility is known to have been subject to several gross spill episodes so the possibility of separate phase chlorobenzenes in soils exists.

It is recommended that: (1) site characterization data are re-evaluated with respect to phase distribution of the contaminants, (2) clean-up goals are identified, and (3) a list of the specific technologies applicable, given these criteria, are identified. A literature review focused on the fate, transport, and remediation

options associated with site- specific compounds would yield useful information to design specific tests to evaluate the appropriate technologies.

cc: Rich Steimle, 5102W
Kathy Davies, Region 3
Phil Rotstein, Region 3
Norm Kulujian, Region 3

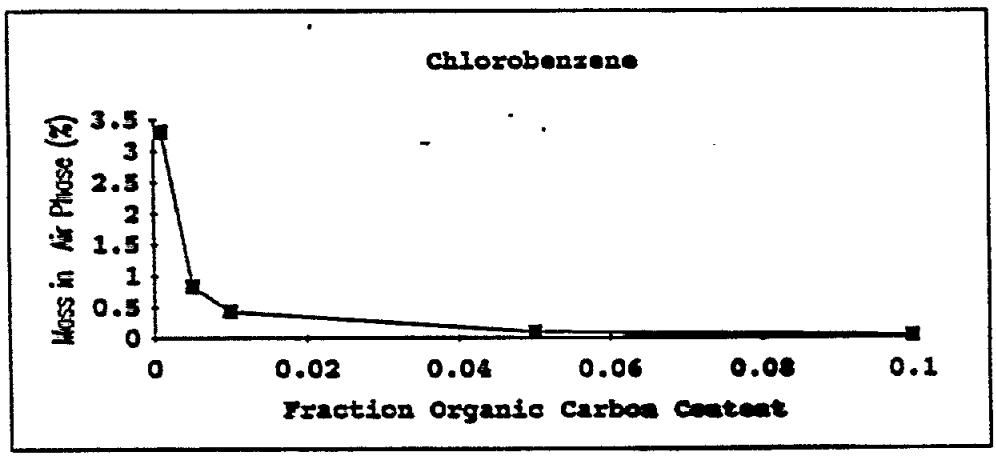
Volatility of Chlorobenzenes: Determination of Mass Fraction in Air Phase

Input Parameters: bulk density = 1.7 g/cm3; volumetric moisture content = 0.2; porosity =0.4

	Koc (cm3/g)	Kh
chlorobenzene	398	0.15
1,4-dichlorobenzene	2754	0.08
1,3,5-trichlorobenzene	14791	0.08
1,2,4,5-tetrachlorobenzene	39811	0.04
pentachlorobenzene	131826	0.03
hexachlorobenzene	257039	0.02

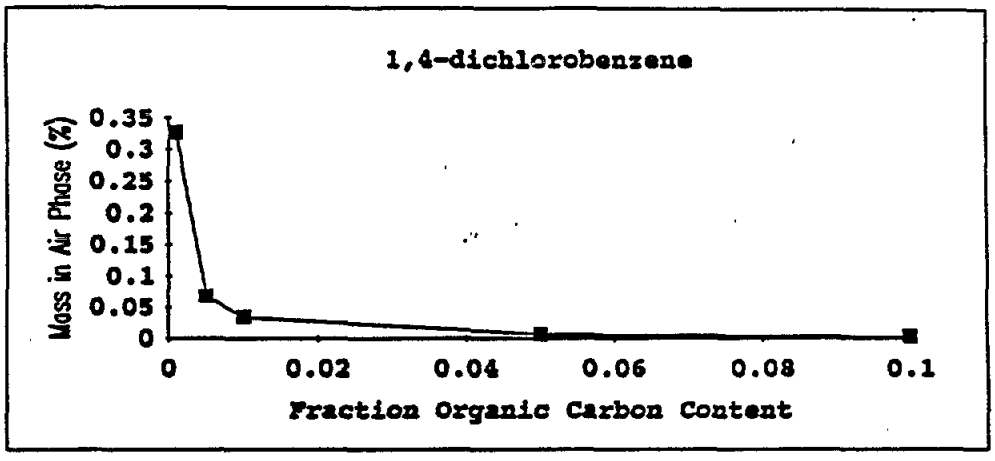
chlorobenzene

foc	air/soil K	Mass in Air (%)
0.001	6.04	3.309067
0.005	24.09	0.830335
0.01	46.64	0.428816
0.05	227.07	0.08808
0.1	452.60	0.044189



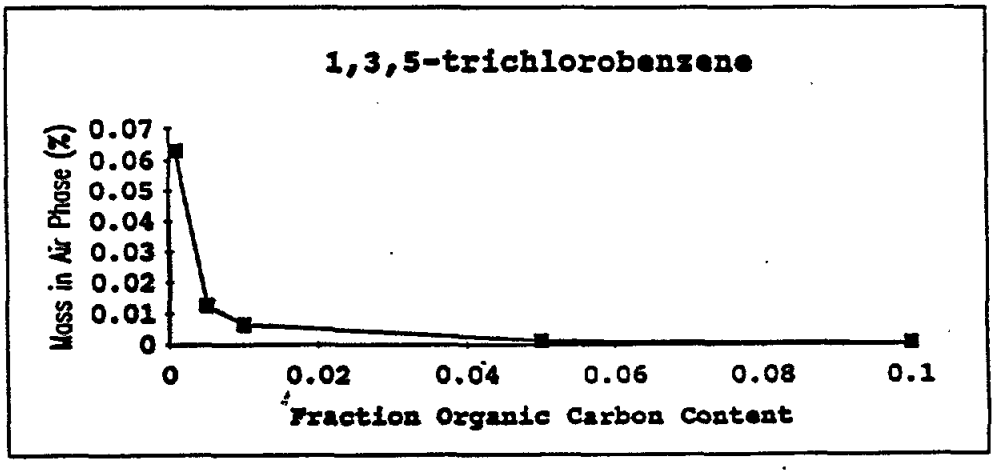
1,4-dichlorobenzene

foc	air/soil K	Mass in Air (%)
0.001	61.22	0.326677
0.005	295.31	0.067725
0.01	587.93	0.034018
0.05	2928.83	0.006829
0.1	5854.95	0.003416



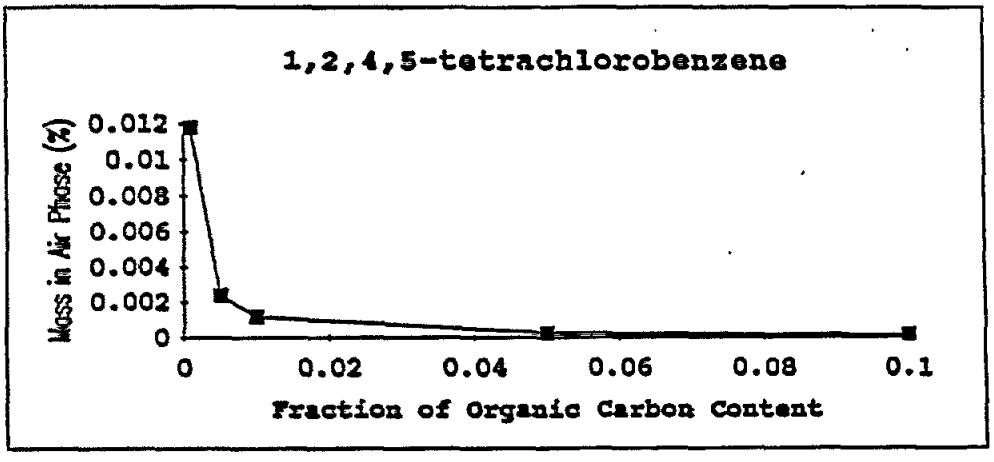
1,3,5-trichlorobenzene

foc	K	Air (%)
0.001	317.01	0.06309
0.005	1574.24	0.012705
0.01	3145.79	0.006358
0.05	15718.14	0.001272
0.1	31433.58	0.000636



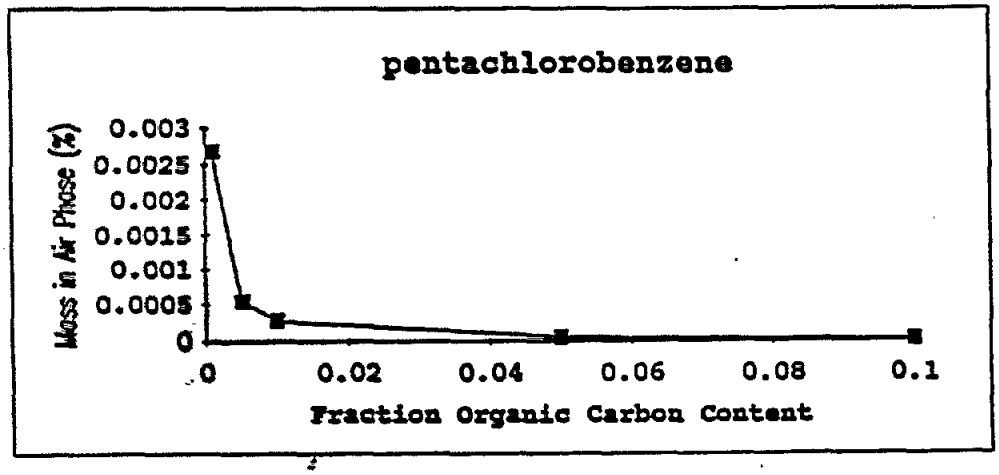
1,2,4,5-tetrachlorobenzene

foc	K	Air (%)
0.001	1.70E+03	0.011784
0.005	8.47E+03	0.002363
0.01	1.69E+04	0.001182
0.05	8.46E+04	0.000236
0.1	1.69E+05	0.000118



pentachlorobenzene

foc	K	Air (%)
0.001	7.48E+03	0.002675
0.005	3.74E+04	0.000535
0.01	7.47E+04	0.000268
0.05	3.74E+05	5.35E-05
0.1	7.47E+05	2.68E-05



Estimation of Total Soil Concentration from Vapor Concentration

$$C_t = C_g \left[\frac{\rho_g K_p}{K_h} + \frac{\theta}{K_h} + \phi \right]$$

Where: C_t = total volatile organic concentration ($mg/cm^3 soil$)

C_g = vapor concentration ($mg/cm^3 air$)

ρ_g = bulk density of soil ($g/cm^3 soil$)

K_p = soil-water partition coefficient (cm^3/g)

K_h = Henry's Law Constant (dimensionless)

θ = volumetric moisture content (dimensionless)

ϕ = volumetric air content (dimensionless)

RSKERL 14810
11/91

DEL. 302 834-4536
NJ. 201 997-1700
TWX 510-666-1629
STD CLOR DECI

STANDARD CHLORINE OF DELAWARE, INC.

GOVERNOR LEA ROAD ● P.O BOX 319 ● DELAWARE CITY, DELAWARE 19706

CERTIFIED MAIL

100456

October 18, 1993

Mr. David B. Everett, P. E.
Project Review Branch Head
P. O. Box 7360
West Trenton, NJ 08628

RE: **Docket No. D-8451 - Groundwater Recovery Report**

Dear Mr. Everett:

Please find enclosed the Third Quarter 1993 Groundwater Recovery Report submitted in accordance with the conditions set forth in Docket No. D-8451, for the period July 1 through September 30, 1993.

The report includes a summary of water withdrawal rates for recovery wells RW-1 through RW-5, water table elevations and results of sample analysis for all previously monitored wells, and a summary of recovery well operations.

Feel free to contact me should there be any questions.

Very truly yours,

Paul Johnston

Paul Johnston
Manager, Environmental

PJ/dm
Enclosure

cc: K. Lose

AR308362

Standard Chlorine of Delaware, Inc.

Third Quarter 1993

Groundwater Recovery Report

DOWN-TIME LOG
July 1993
RECOVERY WELLS #1 THROUGH #5

DATE	WELL	DOWN-TIME	REMARKS
7/1 - 7/31	2	1 month	Pump failure
7/1 - 7/31	5	1 month	Pump failure
7/2/93	1,3,4	2.5 hours	Boiler #3 down for repairs
7/10 - 7/18	1,3,4	8 days	Plant wide shutdown

REPAIRS AND MODIFICATIONS
July 1993

No repairs or modifications were made in the month of July.

DOWN-TIME LOG
August 1993
RECOVERY WELLS #1 THROUGH #5

DATE	WELL	DOWN-TIME	REMARKS
8/1 - 8/31	2	1 month	Pump failure
8/1 - 8/31	5	1 month	Pump failure
8/11/93	1,3,4	6 hours	Boiler #3 outage
8/12/93	1,3,4	9 hours	Boiler #3 outage

REPAIRS AND MODIFICATIONS
August 1993

No repairs or modifications were made in the month of August.

DOWN-TIME LOG
September 1993
RECOVERY WELLS #1 THROUGH #5

DATE	WELL	DOWN-TIME	REMARKS
9/1 - 9/14	2	14 days	Pump failure
9/1 - 9/30	5	1 month	Pump failure
9/7	1-4	1 hour	M-1 column maintenance
9/10	3	15 hours	Leaking discharge line
9/11-9/12	3	2 days	" "
9/13	3	11 hours	Line repaired & well put back on-line
9/14	3	3 hours	Leaking discharge line
9/22-9/30	2	8.5 days	Pump failure
9/27	1-4	9 hours	Plant wide power failure due to storm/tornado
9/28	1-4	23 hours	" "
9/29	1-4	11 hours	Repairs made to Boiler #3
9/30	1-4	2 hours	" "

REPAIRS AND MODIFICATIONS
September 1993

A new pump was installed at GWR well #2 on September 14, 1993. The well operated for one week and the pump failed again. GWR well #2 is scheduled for repairs and should be put back on line during October.

GWR well #5 is also scheduled for repairs and should be put back on-line during October.

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
07/02/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	25-Jun-93	7:47			14996390.00					
	28-Jun-93	7:50		53.70	15176750.00	41.72		6.45	6.47	26.00
	29-Jun-93	7:50		53.82	15235610.00	40.88		6.57	6.22	26.00
	30-Jun-93	7:50		53.72	15296610.00	42.36		6.47	6.55	26.00
	01-Jul-93	7:50		53.70	15355860.00	41.15		6.45	6.38	26.00
	02-Jul-93	7:50	150	48.50	15413040.00	39.71	41.16	1.25	31.77	26.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	25-Jun-93	7:47			26303550.00					
	28-Jun-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	29-Jun-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	30-Jun-93	7:50	1440	46.36	26303550.00	0.00		0.03	0.00	0.00
	01-Jul-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	02-Jul-93	7:50	1440	46.40	26303550.00	0.00	0.00	0.07	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	25-Jun-93	7:47			12349080.00					
	28-Jun-93	7:50		47.90	12415470.00	15.36		9.57	1.60	0.00
	29-Jun-93	7:50		48.72	12437710.00	15.44		10.39	1.49	0.00
	30-Jun-93	7:50		48.18	12460650.00	15.93		9.85	1.62	0.00
	01-Jul-93	7:50		47.80	12482400.00	15.10		9.47	1.59	0.00
	02-Jul-93	7:50	150	38.90	12503250.00	14.48	15.26	0.57	25.40	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	25-Jun-93	7:47			60713560.00					
	28-Jun-93	7:50		48.60	60899800.00	43.11		9.60	4.49	0.00
	29-Jun-93	7:50		48.98	60961140.00	42.60		9.98	4.27	0.00
	30-Jun-93	7:50		48.76	61025270.00	44.53		9.76	4.56	0.00
	01-Jul-93	7:50		48.48	61087090.00	42.93		9.48	4.53	0.00
	02-Jul-93	7:50	150	47.10	61146490.00	41.25	42.88	8.10	5.09	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	25-Jun-93	7:47			9112070.00					
	28-Jun-93	7:50	1440	36.70	9112070.00	0.00		1.54	0.00	0.00
	29-Jun-93	7:50	1440	35.80	9112070.00	0.00		0.64	0.00	0.00
	30-Jun-93	7:50	1440	35.80	9112070.00	0.00		0.64	0.00	0.00
	01-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0.00	0.00
	02-Jul-93	7:50	1440	35.70	9112070.00	0.00	0.00	0.54	0.00	0.00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
07/09/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	02-Jul-93	7:47			15413040.00					
	05-Jul-93	7:50		53.90	15589000.00	40.70		6.65	6.12	26 00
	06-Jul-93	7:50		53.90	15650280.00	42.56		6.65	6.40	26 00
	07-Jul-93	7:50		53.90	15709310.00	40.99		6.65	6.16	26 00
	08-Jul-93	7:50		53.80	15768080.00	40.81		6.55	6.23	26 00
	09-Jul-93	7:50		53.80	15826800.00	40.78	41.17	6.55	6.23	26 00

WELL#2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	02-Jul-93	7:47			26303550.00					
	05-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0 00
	06-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0 00
	07-Jul-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0 00
	08-Jul-93	7:50	1440	46.36	26303550.00	0.00		0.03	0.00	0 00
	09-Jul-93	7:50	1440	46.36	26303550.00	0.00	0.00	0.03	0.00	0 00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	02-Jul-93	7 47			12503250.00					
	05-Jul-93	7 50		48.60	12570000.00	15.44		10.27	1.50	0 00
	06-Jul-93	7 50		48 60	12595530.00	17.73		10.27	1.73	0 00
	07-Jul-93	7 50		48.70	12618000.00	15.60		10.37	1.50	0 00
	08-Jul-93	7 50		48 28	12640530.00	15.65		9.95	1.57	0 00
	09-Jul-93	7 50		48.28	12663000.00	15.60	16.00	9.95	1.57	0 00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	02-Jul-93	7:47			61146490.00					
	05-Jul-93	7:50		48.90	61339000.00	44.56		9.90	4 50	0 00
	06-Jul-93	7:50		48.90	61404310.00	45.35		9.90	4.58	0 00
	07-Jul-93	7:50		48.86	61467880.00	44.15		9.86	4.48	0 00
	08-Jul-93	7:50		48.70	61531070.00	43.88		9.70	4.52	0 00
	09-Jul-93	7:50		48.70	61594500.00	44.05	44.40	9.70	4.54	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	02-Jul-93	7:47			9112070.00					
	05-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0.00	0 00
	06-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0 00	0 00
	07-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0 00	0 00
	08-Jul-93	7 50	1440	35.70	9112070.00	0.00		0 54	0 00	0 00
	09-Jul-93	7 50	1440	[illegible]	9112070.00	0.00	0.00	0 52	0 00	[illegible]00

AR308368

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
07/16/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	09-Jul-93	7:47			15826800.00					
	12-Jul-93	7:50	1440	48.22	15890690.00	14.78		0.97	15.24	0.00
	13-Jul-93	7:50	1440	47.86	15890690.00	0.00		0.61	0.00	0.00
	14-Jul-93	7:50	1440	47.76	15890690.00	0.00		0.51	0.00	0.00
	15-Jul-93	7:50	1440	47.70	15890690.00	0.00		0.45	0.00	0.00
	16-Jul-93	7:50	1440	47.70	15890690.00	0.00	2.96	0.45	0.00	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	09-Jul-93	7:47			26303550.00					
	12-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	13-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	14-Jul-93	7:50	1440	46.38	26303550.00	0.00		0.05	0.00	0.00
	15-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	16-Jul-93	7:50	1440	46.36	26303550.00	0.00	0.00	0.03	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	09-Jul-93	7:47			12663000.00					
	12-Jul-93	7:50	1440	38.48	12684340.00	4.94		0.15	32.91	0.00
	13-Jul-93	7:50	1440	38.40	12684340.00	0.00		0.07	0.00	0.00
	14-Jul-93	7:50	1440	38.34	12684340.00	0.00		0.01	0.00	0.00
	15-Jul-93	7:50	1440	38.40	12684340.00	0.00		0.07	0.00	0.00
	16-Jul-93	7:50	1440	38.32	12684340.00	0.00	0.99	-0.01	0.00	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	09-Jul-93	7:47			61594500.00					
	12-Jul-93	7:50	1440	40.46	61660320.00	15.24		1.46	10.44	0.00
	13-Jul-93	7:50	1440	40.46	61660320.00	0.00		1.46	0.00	0.00
	14-Jul-93	7:50	1440	40.44	61660320.00	0.00		1.44	0.00	0.00
	15-Jul-93	7:50	1440	40.44	61660320.00	0.00		1.44	0.00	0.00
	16-Jul-93	7:50	1440	40.44	61660320.00	0.00	3.05	1.44	0.00	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	09-Jul-93	7:47			9112070.00					
	12-Jul-93	7:50	1440	35.68	9112070.00	0.00		0.52	0.00	0.00
	13-Jul-93	7:50	1440	35.68	9112070.00	0.00		0.52	0.00	0.00
	14-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0.00	0.00
	15-Jul-93	7:50	1440	35.70	9112070.00	0.00		0.54	0.00	0.00
	16-Jul-93	7:50	1440	35.70	9112070.00	0.00	0.00	0.54	0.00	0.00

AR308369

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
07/23/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	16-Jul-93	7:47			15890690.00					
	19-Jul-93	7:50		54.46	15947000.00	13.03		7.23	1.80	0 00
	20-Jul-93	7:50		54.40	16010170.00	43.87		7.15	6.14	0 00
	21-Jul-93	7:50		54.46	16065850.00	38.67		7.21	5.36	0 00
	22-Jul-93	7:50		54.50	16126560.00	42.16		7.25	5.82	0 00
	23-Jul-93	7:50		54.30	16186520.00	41.64	35.87	7.05	5.91	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	16-Jul-93	7:47			26303550.00					
	19-Jul-93	7:50	1440	46.20	26303550.00	0.00		-0.13	0.00	0 00
	20-Jul-93	7:50	1440	46.20	26303550.00	0.00		-0.13	0.00	0 00
	21-Jul-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0 00
	22-Jul-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0 00
	23-Jul-93	7:50	1440	46.32	26303550.00	0.00	0.00	-0.01	0.00	0 00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	16-Jul-93	7:47			12684340.00					
	19-Jul-93	7:50		47.56	12706500.00	5.13		9.23	0.56	0 00
	20-Jul-93	7:50		47.50	12728280.00	15.13		9.17	1.65	0 00
	21-Jul-93	7:50		47.70	12750230.00	15.24		9.37	1.63	0 00
	22-Jul-93	7:50		47.50	12771850.00	15.01		9.17	1.64	0 00
	23-Jul-93	7:50		47.36	12792920.00	14.63	13.03	9.03	1.62	0 00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	16-Jul-93	7:47			61660320.00					
	19-Jul-93	7:50		48.40	61723000.00	14.51		9.40	1.54	0 00
	20-Jul-93	7:50		48.30	61782610.00	41.40		9.30	4.45	0 00
	21-Jul-93	7:50		48.50	61845390.00	43.60		9.50	4.59	0 00
	22-Jul-93	7:50		48.40	61907210.00	42.93		9.40	4.57	0 00
	23-Jul-93	7:50		48.32	61968130.00	42.31	36.95	9.32	4.54	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	16-Jul-93	7:47			9112070.00					
	19-Jul-93	7:50	1440	35.70	9112090.00	0.00		0.54	0 01	0 00
	20-Jul-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0 00
	21-Jul-93	7:50	1440	35.80	9112090.00	0.00		0.64	0.00	0 00
	22-Jul-93	7:50	1440	35.70	9112090.00	0.00		0.54	0 00	0 00
	23-Jul-93	7:50	1440	35.60	9112090.00	0.00	0.00	0.44	0.0	0 00

AR308370

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
07/30/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	23-Jul-93	7:47			16186520.00					
	26-Jul-93	7:50		54.12	16364620.00	41.20		6.87	6.00	0.00
	27-Jul-93	7:50		54.10	16423060.00	40.58		6.85	5.92	0.00
	28-Jul-93	7:50		54.14	16481840.00	40.82		6.89	5.92	0.00
	29-Jul-93	7:50		54.14	16540270.00	40.58		6.89	5.89	0.00
	30-Jul-93	7:50		54.14	16597920.00	40.03	40.64	6.89	5.81	0.00

WELL# 2
STATIC = 46.33

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	23-Jul-93	7:47			26303550.00					
	26-Jul-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	27-Jul-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	28-Jul-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	29-Jul-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	30-Jul-93	7:50	1440	46.34	26303550.00	0.00	0.00	0.01	0.00	0.00

WELL# 3
STATIC = 38.33

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	23-Jul-93	7:47			12792920.00					
	26-Jul-93	7:50		47.20	12855180.00	14.40		8.87	1.62	0.00
	27-Jul-93	7:50		47.24	12875210.00	13.91		8.91	1.56	0.00
	28-Jul-93	7:50		47.26	12895090.00	13.81		8.93	1.55	0.00
	29-Jul-93	7:50		47.28	12914560.00	13.52		8.95	1.51	0.00
	30-Jul-93	7:50		47.22	12933380.00	13.07	13.74	8.89	1.47	0.00

WELL# 4
STATIC = 39.00

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	23-Jul-93	7:47			61968130.00					
	26-Jul-93	7:50		48.18	62149190.00	41.91		9.18	4.57	0.00
	27-Jul-93	7:50		48.12	62207920.00	40.78		9.12	4.47	0.00
	28-Jul-93	7:50		48.12	62266920.00	40.97		9.12	4.49	0.00
	29-Jul-93	7:50		48.28	62325260.00	40.51		9.28	4.37	0.00
	30-Jul-93	7:50		48.18	62382440.00	39.71	40.78	9.18	4.33	0.00

WELL# 5
STATIC = 35.16

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	23-Jul-93	7:47			9112090.00					
	26-Jul-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	27-Jul-93	7:50	1440	35.68	9112090.00	0.00		0.52	0.00	0.00
	28-Jul-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	29-Jul-93	7:50	1440	35.68	9112090.00	0.00		0.52	0.00	0.00
	30-Jul-93	7:50	1440	35.70	9112090.00	0.00	0.00	0.54	0.00	0.00

AR308371

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
06/06/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	30-Jul-93	7:47			16597920.00					
	02-Aug-93	7:50		54.00	16761930.00	37.94		6.75	5.62	0.00
	03-Aug-93	7:50		53.90	16816840.00	38.13		6.65	5.73	0.00
	04-Aug-93	7:50		53.80	16869730.00	36.73		6.55	5.61	0.00
	05-Aug-93	7:50		53.80	16922870.00	36.90		6.55	5.63	0.00
	06-Aug-93	7:50		53.80	16974940.00	36.16	37.17	6.55	5.52	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	30-Jul-93	7:47			26303550.00					
	02-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	03-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	04-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	05-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	06-Aug-93	7:50	1440	46.40	26303550.00	0.00	0.00	0.07	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	30-Jul-93	7:47			12933360.00					
	02-Aug-93	7:50		46.00	12979900.00	10.76		7.67	1.40	0.00
	03-Aug-93	7:50		45.10	12994670.00	10.26		6.77	1.52	0.00
	04-Aug-93	7:50		44.80	13006500.00	9.80		6.47	1.48	0.00
	05-Aug-93	7:50		44.80	13021680.00	9.15		6.27	1.46	0.00
	06-Aug-93	7:50		44.40	13033960.00	8.53	9.66	6.07	1.40	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	30-Jul-93	7:47			62362440.00					
	02-Aug-93	7:50		47.50	62541418.00	36.80		8.50	4.33	0.00
	03-Aug-93	7:50		47.10	62594110.00	36.59		8.10	4.52	0.00
	04-Aug-93	7:50		46.98	62644710.00	35.14		7.98	4.40	0.00
	05-Aug-93	7:50		46.84	62695480.00	35.26		7.84	4.50	0.00
	06-Aug-93	7:50		47.00	62744990.00	34.38	35.63	8.00	4.30	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	30-Jul-93	7:47			9112090.00					
	02-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	03-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	04-Aug-93	7:50	1440	35.74	9112090.00	0.00		0.58	0.00	0.00
	05-Aug-93	7:50	1440	35.50	9112090.00	0.00		0.34	0.00	0.00
	06-Aug-93	7:50	1440	[illegible]	9112090.00	0.00	0.00	0.62	0.00	0.00

AR308372

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
08/13/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	06-Aug-93	7:47			16974940.00					
	09-Aug-93	7:50		43.90	17129100.00	35.66		-3.35	-10.64	0.00
	10-Aug-93	7:50		53.72	17178960.00	34.63		6.47	5.35	0.00
	11-Aug-93	7:50	360	53.76	17230030.00	35.47		6.51	5.45	0.00
	12-Aug-93	7:50	540	54.22	17272140.00	29.24		6.97	4.20	0.00
	13-Aug-93	7:50		54.16	17306660.00	23.97	31.79	6.91	3.47	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	06-Aug-93	7:47			26303550.00					
	09-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	10-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	11-Aug-93	7:50	1440	46.40	26303550.00	0.00		0.07	0.00	0.00
	12-Aug-93	7:50	1440	46.38	26303550.00	0.00		0.05	0.00	0.00
	13-Aug-93	7:50	1440	46.40	26303550.00	0.00	0.00	0.07	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	06-Aug-93	7:47			13033960.00					
	09-Aug-93	7:50		43.70	13068630.00	8.02		5.37	1.49	0.00
	10-Aug-93	7:50		43.70	13079040.00	7.23		5.37	1.35	0.00
	11-Aug-93	7:50	360	43.90	13090310.00	7.83		5.57	1.41	0.00
	12-Aug-93	7:50	540	45.10	13101670.00	7.89		6.77	1.17	0.00
	13-Aug-93	7:50		45.40	13110920.00	6.42	7.48	7.07	0.91	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	06-Aug-93	7:47			62744990.00					
	09-Aug-93	7:50		46.26	62891330.00	33.88		7.26	4.67	0.00
	10-Aug-93	7:50		46.20	62938300.00	32.62		7.20	4.53	0.00
	11-Aug-93	7:50	360	46.24	62986590.00	33.53		7.24	4.63	0.00
	12-Aug-93	7:50	540	46.74	63023130.00	25.38		7.74	3.28	0.00
	13-Aug-93	7:50		46.80	63053680.00	21.22	29.32	7.80	2.72	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	06-Aug-93	7:47			9112090.00					
	09-Aug-93	7:50	1440	35.78	9112090.00	0.00		0.62	0.00	0.00
	10-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	11-Aug-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	12-Aug-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	13-Aug-93	7:50	1440	35.74	9112090.00	0.00	0.00	0.58	0.00	0.00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
08/20/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	13-Aug-93	7:47			17306660.00					
	16-Aug-93	7:50		54.28	17478670.00	39.79		7.03	5.66	0.00
	17-Aug-93	7:50		54.00	17534480.00	38.76		6.75	5.74	0.00
	18-Aug-93	7:50		53.90	17588390.00	37.44		6.65	5.63	0.00
	19-Aug-93	7:50		53.90	17643110.00	38.00		6.65	5.71	0.00
	20-Aug-93	7:50		54.00	17697570.00	37.82	38.36	6.75	5.60	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	13-Aug-93	7:47			26303550.00					
	16-Aug-93	7:50	1440	46.36	26303550.00	0.00		0.03	0.00	0.00
	17-Aug-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	18-Aug-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	19-Aug-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	20-Aug-93	7:50	1440	46.34	26303550.00	0.00	0.00	0.01	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	13-Aug-93	7:47			13110920.00					
	16-Aug-93	7:50		46.06	13166920.00	12.95		7.73	1.68	0.00
	17-Aug-93	7:50		45.40	13183530.00	11.53		7.07	1.63	0.00
	18-Aug-93	7:50		45.40	13196690.00	10.53		7.07	1.49	0.00
	19-Aug-93	7:50		45.10	13213320.00	10.16		6.77	1.50	0.00
	20-Aug-93	7:50		45.80	13228780.00	10.74	11.18	7.47	1.44	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	13-Aug-93	7:47			63053660.00					
	16-Aug-93	7:50		47.08	63223910.00	39.41		8.08	4.68	0.00
	17-Aug-93	7:50		46.70	63277510.00	37.22		7.70	4.83	0.00
	18-Aug-93	7:50		46.70	63329000.00	35.76		7.70	4.64	0.00
	19-Aug-93	7:50		46.50	63380570.00	35.81		7.50	4.78	0.00
	20-Aug-93	7:50		46.80	63432100.00	35.76	36.80	7.80	4.59	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	13-Aug-93	7:47			9112090.00					
	16-Aug-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	17-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	18-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	19-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	20-Aug-93	7:50	1440	[redacted]	9112090.00	0.00	0.00	0.54	0.00	[redacted]

AR308374

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
08/27/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	20-Aug-93	7:47			17697570.00					
	23-Aug-93	7:50		54.00	17863830.00	38.46		6.75	5.70	0.00
	24-Aug-93	7:50		54.00	17918800.00	38.17		6.75	5.66	0.00
	25-Aug-93	7:50		53.96	17973110.00	37.72		6.71	5.62	0.00
	26-Aug-93	7:50		53.80	18027020.00	37.44		6.55	5.72	0.00
	27-Aug-93	7:50		53.76	18080130.00	36.88	37.73	6.51	5.67	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	20-Aug-93	7:47			26303550.00					
	23-Aug-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	24-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	25-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	26-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	27-Aug-93	7:50	1440	46.32	26303550.00	0.00	0.00	-0.01	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	20-Aug-93	7:47			13226780.00					
	23-Aug-93	7:50		45.30	13277430.00	11.25		6.97	1.61	0.00
	24-Aug-93	7:50		45.50	13293120.00	10.90		7.17	1.52	0.00
	25-Aug-93	7:50		45.40	13306700.00	10.82		7.07	1.53	0.00
	26-Aug-93	7:50		45.20	13323830.00	10.51		6.87	1.53	0.00
	27-Aug-93	7:50		44.70	13337790.00	9.69	10.63	6.37	1.52	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	20-Aug-93	7:47			63432100.00					
	23-Aug-93	7:50		46.56	63590770.00	36.73		7.56	4.86	0.00
	24-Aug-93	7:50		46.60	63643710.00	36.76		7.60	4.84	0.00
	25-Aug-93	7:50		46.64	63696210.00	36.46		7.64	4.77	0.00
	26-Aug-93	7:50		46.50	63748040.00	35.99		7.50	4.80	0.00
	27-Aug-93	7:50		46.30	63798860.00	35.29	36.25	7.30	4.83	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	20-Aug-93	7:47			9112090.00					
	23-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	24-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	25-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	26-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	27-Aug-93	7:50	1440	35.70	9112090.00	0.00	0.00	0.54	0.00	0.00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
09/03/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	27-Aug-93	7:47			18060130.00					
	30-Aug-93	7:50		53.60	18232320.00	35.20		6.35	5.54	0.00
	31-Aug-93	7:50		53.70	18281860.00	34.42		6.45	5.34	0.00
	01-Sep-93	7:50		54.12	18337720.00	36.78		6.87	5.64	0.00
	02-Sep-93	7:50		54.22	18392440.00	36.00		6.97	5.45	0.00
	03-Sep-93	7:50		54.10	18448680.00	39.06	37.09	6.85	5.70	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	27-Aug-93	7:47			26303550.00					
	30-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	31-Aug-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	01-Sep-93	7:50	1440	46.30	26303550.00	0.00		-0.03	0.00	0.00
	02-Sep-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	03-Sep-93	7:50	1440	46.30	26303550.00	0.00	0.00	-0.03	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	27-Aug-93	7:47			13337790.00					
	30-Aug-93	7:50		43.42	13374590.00	8.51		5.09	1.67	0.00
	31-Aug-93	7:50		43.70	13383460.00	6.16		5.37	1.15	0.00
	01-Sep-93	7:50		46.30	13401330.00	12.41		7.97	1.56	0.00
	02-Sep-93	7:50		46.50	13419180.00	12.40		8.17	1.52	0.00
	03-Sep-93	7:50		46.44	13437490.00	12.72	10.44	8.11	1.57	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	27-Aug-93	7:47			63798860.00					
	30-Aug-93	7:50		45.62	63943090.00	33.39		6.62	5.04	0.00
	31-Aug-93	7:50		45.80	63990150.00	32.68		6.80	4.81	0.00
	01-Sep-93	7:50		46.70	64046280.00	38.98		7.70	5.06	0.00
	02-Sep-93	7:50		46.72	64101730.00	38.51		7.72	4.99	0.00
	03-Sep-93	7:50		46.70	64158900.00	39.70	36.65	7.70	5.16	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	27-Aug-93	7:47			9112090.00					
	30-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	31-Aug-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	01-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	02-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	03-Sep-93	7:50	1440	[illegible]70	9112090.00	0.00	0.00	0.54	0.00	[illegible]00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
09/10/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	03-Sep-93	7:47			18448680.00					
	06-Sep-93	7:50		54.10	18615000.00	38.47		6.85	5.62	0.00
	07-Sep-93	7:50	60	54.10	18671100.00	38.96		6.85	5.69	0.00
	08-Sep-93	7:50		54.56	18725430.00	37.73		7.31	5.16	0.00
	09-Sep-93	7:50		54.50	18784820.00	41.24		7.25	5.69	0.00
	10-Sep-93	7:50		54.20	18842770.00	40.24	39.33	6.95	5.79	0.00

WELL#2
STATIC = 46.33

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	03-Sep-93	7:47			26303550.00					
	06-Sep-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	07-Sep-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	08-Sep-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	09-Sep-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	10-Sep-93	7:50	1440	46.32	26303550.00	0.00	0.00	-0.01	0.00	0.00

WELL# 3
STATIC = 38.33

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	03-Sep-93	7:47			13437490.00					
	06-Sep-93	7:50		46.70	13493000.00	12.84		8.37	1.53	0.00
	07-Sep-93	7:50	60	46.70	13511630.00	12.94		8.37	1.55	0.00
	08-Sep-93	7:50		47.26	13529890.00	12.68		8.95	1.42	0.00
	09-Sep-93	7:50		46.90	13550240.00	14.13		8.57	1.65	0.00
	10-Sep-93	7:50	900	46.60	13569200.00	13.17	13.15	8.27	1.59	0.00

WELL# 4
STATIC = 39.00

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	03-Sep-93	7:47			64158900.00					
	06-Sep-93	7:50		46.70	64329000.00	39.38		7.70	5.11	0.00
	07-Sep-93	7:50	60	46.70	64386140.00	39.68		7.70	5.15	0.00
	08-Sep-93	7:50		47.00	64439770.00	37.24		8.00	4.66	0.00
	09-Sep-93	7:50		46.80	64497830.00	40.32		7.80	5.17	0.00
	10-Sep-93	7:50		46.64	64554220.00	39.16	39.16	7.64	5.13	0.00

WELL# 5
STATIC = 35.16

OLD DATA:	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
	03-Sep-93	7:47			9112090.00					
	06-Sep-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	07-Sep-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	08-Sep-93	7:50	1440	35.72	9112090.00	0.00		0.56	0.00	0.00
	09-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	10-Sep-93	7:50	1440	35.70	9112090.00	0.00	0.00	0.54	0.00	0.00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
09/17/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	10-Sep-93	7:47			18842770.00					
	13-Sep-93	7:50		54.30	19017530.00	40.43		7.05	5.73	0.00
	14-Sep-93	7:50		54.10	19074360.00	39.47		6.85	5.76	0.00
	15-Sep-93	7:50		54.30	19131690.00	39.81		7.05	5.65	0.00
	16-Sep-93	7:50		54.20	19189820.00	40.37		6.95	5.81	0.00
	17-Sep-93	7:50		54.14	19247550.00	40.09	40.03	6.89	5.82	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	10-Sep-93	7:47			26303550.00					
	13-Sep-93	7:50	1440	46.32	26303550.00	0.00		-0.01	0.00	0.00
	14-Sep-93	7:50	1440	46.34	26303550.00	0.00		0.01	0.00	0.00
	15-Sep-93	7:50		50.00	26316150.00	8.75		3.67	2.38	0.00
	16-Sep-93	7:50		49.20	26330490.00	9.96		2.87	3.47	0.00
	17-Sep-93	7:50		49.00	26344670.00	9.85	5.71	2.67	3.69	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	10-Sep-93	7:47			13569200.00					
	13-Sep-93	7:50	660	38.80	13569210.00	0.00		0.47	0.00	0.00
	14-Sep-93	7:50	180	45.60	13581150.00	8.29		7.27	1.14	0.00
	15-Sep-93	7:50		47.24	13595670.00	10.22		8.91	1.15	0.00
	16-Sep-93	7:50		47.46	13613900.00	12.52		9.13	1.37	0.00
	17-Sep-93	7:50		47.70	13632430.00	12.87	8.78	9.37	1.37	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	10-Sep-93	7:47			64554220.00					
	13-Sep-93	7:50		46.90	64743280.00	43.76		7.90	5.54	0.00
	14-Sep-93	7:50		46.20	64797130.00	37.40		7.20	5.19	0.00
	15-Sep-93	7:50		46.80	64853490.00	39.14		7.80	5.15	0.00
	16-Sep-93	7:50		45.58	64911800.00	40.49		6.58	6.15	0.00
	17-Sep-93	7:50		46.66	64970300.00	40.63	40.28	7.66	5.30	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	10-Sep-93	7:47			9112090.00					
	13-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	14-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	15-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	16-Sep-93	7:50	1440	[illegible]	9112090.00	0.00		0.64	0.00	0.00
	17-Sep-93	7:50	1440	[illegible]	9112090.00	0.00	0.00	0.72	0.00	[illegible]00

AR308378

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
09/24/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	17-Sep-93	7:47			19247550.00					
	20-Sep-93	7:50		54.10	19422540.00	40.48		6.85	5.91	0.00
	21-Sep-93	7:50		54.10	19480910.00	40.53		6.85	5.92	0.00
	22-Sep-93	7:50		54.10	19538020.00	39.66		6.85	5.79	0.00
	23-Sep-93	7:50		54.10	19594430.00	39.17		6.85	5.72	0.00
	24-Sep-93	7:50		54.10	19650740.00	39.10	39.79	6.85	5.71	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	17-Sep-93	7:47			26344670.00					
	20-Sep-93	7:50		49.60	26388890.00	10.23		3.27	3.13	0.00
	21-Sep-93	7:50		50.00	26403410.00	10.08		3.67	2.75	0.00
	22-Sep-93	7:50	720	49.80	26411540.00	5.65		3.47	1.63	0.00
	23-Sep-93	7:50	1440	46.54	26411540.00	0.00		0.21	0.00	0.00
	24-Sep-93	7:50	1440	46.48	26411540.00	0.00	5.19	0.15	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	17-Sep-93	7:47			13632430.00					
	20-Sep-93	7:50		48.98	13691210.00	13.60		10.65	1.28	0.00
	21-Sep-93	7:50		47.90	13711448.00	14.05		9.57	1.47	0.00
	22-Sep-93	7:50		47.00	13730430.00	13.18		8.67	1.52	0.00
	23-Sep-93	7:50		47.00	13748830.00	12.78		8.67	1.47	0.00
	24-Sep-93	7:50		47.14	13767144.00	12.72	13.27	8.81	1.44	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	17-Sep-93	7:47			64970300.00					
	20-Sep-93	7:50		46.70	65149440.00	41.47		7.70	5.39	0.00
	21-Sep-93	7:50		46.64	65209490.00	41.70		7.64	5.46	0.00
	22-Sep-93	7:50		46.28	65266470.00	39.57		7.28	5.44	0.00
	23-Sep-93	7:50		46.20	65323800.00	39.81		7.20	5.53	0.00
	24-Sep-93	7:50		46.20	65380250.00	39.20	40.35	7.20	5.44	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	17-Sep-93	7:47			9112090.00					
	20-Sep-93	7:50	1440	35.90	9112090.00	0.00		0.74	0.00	0.00
	21-Sep-93	7:50	1440	35.70	9112090.00	0.00		0.54	0.00	0.00
	22-Sep-93	7:50	1440	35.80	9112090.00	0.00		0.64	0.00	0.00
	23-Sep-93	7:50	1440	35.80	9112090.00	0.00		0.64	0.00	0.00
	24-Sep-93	7:50	1440	35.82	9112090.00	0.00	0.00	0.66	0.00	0.00

STANDARD CHLORINE OF DE INC
DELAWARE CITY PLANT

FILE NAME:RECWEL
10/01/93
GROUND WATER RECOVERY WELLS

WELL# 1
STATIC = 47.25

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	24-Sep-93	7:47			19650740.00					
	27-Sep-93	7:50	540	54.02	19619790.00	39.10		6.77	5.78	0.00
	28-Sep-93	7:50	1380	48.30	19637220.00	12.10		1.05	11.53	0.00
	29-Sep-93	7:50	660	54.68	19660790.00	16.37		7.63	2.15	0.00
	30-Sep-93	7:50	120	54.68	19691330.00	21.21		7.43	2.85	0.00
	01-Oct-93	7:50		54.68	19952850.00	42.72	26.30	7.43	5.75	0.00

WELL# 2
STATIC = 46.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	24-Sep-93	7:47			26411540.00					
	27-Sep-93	7:50	1440	46.50	26411540.00	0.00		0.17	0.00	0.00
	28-Sep-93	7:50	1440	46.36	26411540.00	0.00		0.03	0.00	0.00
	29-Sep-93	7:50	1440	46.30	26411540.00	0.00		-0.03	0.00	0.00
	30-Sep-93	7:50	1440	46.26	26411540.00	0.00		-0.07	0.00	0.00
	01-Oct-93	7:50	1440	46.36	26411540.00	0.00	0.00	0.03	0.00	0.00

WELL# 3
STATIC = 38.33

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	24-Sep-93	7:47			13767144.00					
	27-Sep-93	7:50	540	47.40	13824200.00	13.20		9.07	1.46	0.00
	28-Sep-93	7:50	1380	38.80	13829750.00	3.85		0.47	8.20	0.00
	29-Sep-93	7:50	660	49.46	13838780.00	6.27		11.13	0.56	0.00
	30-Sep-93	7:50	120	49.30	13850350.00	8.03		10.97	0.73	0.00
	01-Oct-93	7:50		49.70	13875330.00	17.35	9.74	11.37	1.53	0.00

WELL# 4
STATIC = 39.00

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	24-Sep-93	7:47			65380250.00					
	27-Sep-93	7:50	540	46.14	65552200.00	39.80		7.14	5.57	0.00
	28-Sep-93	7:50	1380	40.62	65568460.00	11.29		1.82	6.20	0.00
	29-Sep-93	7:50	660	46.88	65593560.00	17.43		7.88	2.21	0.00
	30-Sep-93	7:50	120	46.90	65625610.00	22.26		7.90	2.82	0.00
	01-Oct-93	7:50		47.20	65694660.00	48.09	27.77	8.20	5.86	0.00

WELL# 5
STATIC = 35.16

	DATE	TIME	DOWN TIME (MIN)	LEVEL	TOTALIZER	G.P.M.	AVG. GPM/WK.	DRAWDOWN	S.C.	PSI
OLD DATA:	24-Sep-93	7:47			9112090.00					
	27-Sep-93	7:50	1440	35.86	9112090.00	0.00		0.70	0.00	0.00
	28-Sep-93	7:50	1440	35.78	9112090.00	0.00		0.62	0.00	0.00
	29-Sep-93	7:50	1440	35.90	9112100.00	0.01		0.74	0.01	0.00
	30-Sep-93	7:50	1440	35.90	9112100.00	0.00		0.74	0.00	0.00
	01-Oct-93	7:50	1440	35.90	9112100.00	0.00	0.00	0.74	0.00	0.00

AR308380

WELL RESULTS
SAMPLING DATE 9/19/93 (VOA for RW - 3 collected 9/23/93)

WELL #	pH	BENZENE	MONO	p-DCB	m-DCB	o-DCB	135	124	123	NB	1245	1234	MCNB	2,4 -DCNB	PENTA	HEXA	TOTAL	% TFT RECOV.	% FB RECOV.
TW - 1	5.28	<0.100	13.28	0.21	<0.200	<0.200	<0.010	0.03	0.01	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	13.52	85.60	116.70
TW - 2	5.80	0.06	3.93	0.23	<0.10	0.17	<0.010	0.07	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	4.46	79.90	99.00
TW - 3	6.18	<0.005	0.01	0.01	<0.010	<0.010	<0.010	0.01	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.03	89.60	83.30
TW - 4	6.58	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.01	89.60	104.70
TW - 5	3.95	15.34	150.95	43.59	<5.00	30.99	<0.010	5.81	0.42	<0.015	0.05	0.14	<0.020	<0.015	<0.010	<0.010	247.29	89.80	66.50
TW - 6	<---------- NOT COLLECTED ----------																		
TW - 6A	5.89	<0.25	17.69	2.73	<.50	14.91	<0.010	4.50	1.10	<0.015	0.08	0.03	<0.020	<0.015	<0.010	<0.010	41.03	183.30	99.30
TW - 7	6.35	<0.25	0.89	11.97	1.17	2.84	0.02	8.46	2.61	<0.015	0.10	0.56	<0.020	<0.015	0.02	<0.010	28.63	85.70	85.70
TW - 8	4.83	32.17	98.75	5.94	<2.00	57.51	0.01	4.46	1.13	<0.015	0.03	0.16	<0.020	<0.015	<0.010	<0.010	200.16	84.90	92.10
TW - 10	7.37	<0.010	<0.010	0.39	<0.020	0.03	0.01	2.63	1.13	<0.015	0.09	0.52	<0.020	<0.015	0.02	<0.010	4.83	67.20	72.10
TW - 22	8.37	<0.005	<0.005	0.03	<0.010	<0.010	<0.010	0.02	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.05	91.30	95.50
TW - 24	8.19	<0.005	0.01	0.03	<0.010	0.25	<0.010	0.02	<0.010	<0.015	<0.010	0.02	<0.020	<0.015	<0.010	<0.010	0.31	86.60	77.00
TW - 25	8.09	<0.50	<0.50	5.82	<1.00	21.47	<0.010	2.68	0.17	<0.015	0.05	0.24	<0.020	<0.015	0.02	<0.010	30.45	89.20	84.50
TW - 28	3.96	45.12	79.56	13.58	<2.50	21.20	0.01	7.69	2.53	<0.015	0.16	0.22	<0.020	<0.015	<0.010	<0.010	170.07	97.10	115.80
TW - 30	6.53	9.25	21.95	25.09	2.09	28.57	0.00	9.80	0.82	0.80	1.24	0.78	0.20	0.11	0.04	0.00	100 % FREE ORG., AREA %		
TW - 31	5.97	76.34	82.85	27.88	<2.50	16.83	<0.010	4.25	0.22	<0.015	0.46	0.10	<0.020	<0.015	<0.010	<0.010	208.92	100.30	86.20
TW - 49	5.70	51.24	95.37	35.69	<2.50	30.80	<0.010	1.03	0.20	<0.015	0.04	0.03	<0.020	<0.015	<0.010	<0.010	214.41	90.80	87.70
TW - 50	4.10	78.45	93.75	24.38	<2.50	16.16	0.02	4.22	1.05	<0.015	0.12	0.07	<0.020	<0.015	<0.010	<0.010	218.19	99.10	84.90
RW - 1	6.19	4.44	7.88	12.90	1.61	5.75	<0.02	5.83	1.61	<0.015	0.04	0.18	<0.020	<0.015	0.02	<0.010	40.24	84.70	88.10
RW - 2	5.72	3.67	7.11	12.32	<1.00	5.12	0.02	5.40	1.50	0.02	0.08	0.21	<0.020	<0.015	0.02	<0.010	35.44	88.80	92.10
RW - 3	3.51	12.13	28.20	41.27	9.46	52.96	<0.010	3.45	1.46	0.07	0.04	1.57	<0.020	0.06	<0.010	<0.010	150.65	83.70	77.10
RW - 4	5.95	<1.25	1.56	6.51	<2.50	11.30	<0.010	0.62	0.26	0.91	0.26	0.73	<0.020	<0.015	<0.010	<0.010	22.14	92.10	84.20
GRW - 5	<---------- NOT COLLECTE ----------																		
FIELD BLK	7.03	<.005	<.005	<.005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.00	87.90	92.50
TRIP BLK	7.03	<.005	<.005	<.005	<0.010	<0.010	<---------- NOT ANALYZED FOR SEMIVOLATILES ----------										0.00	93.00	
TW - 1 L.DUP	5.28	<0.10	13.46	<0.20	<0.20	<0.20	<0.010	0.02	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	13.49	88.50	80.70
TW - 1 F.DUP	5.28	<0.10	13.19	0.24	<0.20	<0.20	<0.010	0.02	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	13.45	84.00	88.10
TW -22 L.DU	8.37	<.005	0.03	0.03	<0.010	0.01	<0.010	0.02	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.08	82.70	106.00
TW -22 F.DU	8.37	<.005	0.03	0.03	<0.010	<0.010	<0.010	0.02	<0.010	<0.015	<0.010	<0.010	<0.020	<0.015	<0.010	<0.010	0.07	87.00	92.90

STANDARD CHLORINE OF DELAWARE
MONITORING WELLS WATER-LEVEL MEASUREMENTS

DATE : October 11, 1993

SCD WELL NUMBER	WESTON WELL NUMBER	WELL LOCATION	REFERENCE ELEVATION	DATE	TIME	WATER LEVEL	WATER ELEVATION
TW-1	TW-1	R/R TRACK AREA	44.80	9/29/93	14:15	31.30	13.50
TW-2	TW-2	R/R TRACK AREA	53.74	9/29/93	14:10	40.90	12.84
TW-3	TW-3	R/R TRACK AREA	53.46	9/29/93	14:05	41.40	12.06
TW-4	TW-4	R/R TRACK AREA	52.61	9/29/93	14:07	41.30	11.31
TW-5	TW-5	R/R TRACK AREA	47.91	9/29/93	14:10	34.98	12.93
TW-6	TW-6	R/R TRACK AREA	48.08	9/29/93	14:02	35.26	12.82
TW-6A	TW-6A	R/R TRACK AREA	48.08	9/29/93	14:00	36.44	11.64
TW-7	TW-7	R/R TRACK AREA	47.27	9/29/93	13:57	36.10	11.17
TW-8	TW-8	S. OF STORAGE II	51.14	9/29/93	13:48	38.66	12.48
TW-10	TW-10	MOLD. MACH. AREA	49.60	9/29/93	13:55	38.86	10.74
TW-22	TW-22	E. SIDE BY FENCE	51.23	9/29/93	13:33	41.30	9.93
TW-24	TW-24	E. OF 407R	48.07	9/29/93	13:40	40.14	7.93
TW-25	TW-25	CACL2 PIT AREA	48.12	9/29/93	13:44	37.16	10.96
TW-28	TW-28	N. OF WELD SHOP	51.39	9/29/93	13:25	43.44	7.95
TW-30	TW-30	S. OF MAINT. SHOP	50.94	9/29/93	13:28	41.22	9.72
TW-31	TW-31	W. OF INST. SHOP	49.28	9/29/93	13:45	37.84	11.44
TW-49	TW-49	N. OF RW-2	54.45	9/29/93	12:40	49.90	4.55
TW-50	TW-50	N. OF TW-73	52.87	9/29/93	12:43	48.28	4.59
TW-60	TW-60	E. OF RW-4	45.17	9/29/93	13:05	39.84	5.33
TW-61	TW-61	N. OF TW-71	44.23	9/29/93	12:55	39.50	4.73
TW-62	TW-62	N. OF RW-3	47.64	9/29/93	12:53	43.16	4.48
TW-63	TW-63	N. OF RW-1	52.55	9/29/93	12:20	47.90	4.65
TW-64	TW-64	S. OF RW-3	52.21	9/29/93	13:10	45.54	6.67
TW-70	MW-1	E. OF 706 TANK	49.46	9/29/93	13:30	37.22	12.24
TW-71	MW-2	W. OF RW-4	48.35	9/29/93	13:03	43.38	4.97
TW-72	MW-3	W. OF RW-3	50.23	9/29/93	12:45	45.26	4.97
TW-73	MW-4	W. OF RW-2	55.22	9/29/93	12:35	50.14	5.08
TW-74	MW-5	N. OF RW-4	25.36	9/29/93	13:00	21.06	4.30
TW-75	MW-6	N. OF TW-62	51.43	9/29/93	12:50	47.86	3.57
TW-76	MW-7	N. OF TW-63	48.92	9/29/93	13:20	45.36	3.56
TW-77	MW-8	N.W. OF RW-1	43.22	9/29/93	12:25	39.02	4.20
[redacted]	MW-9	S.W. OF RW-1	47.45	[redacted]/29/93	12:30	40.38	7.07